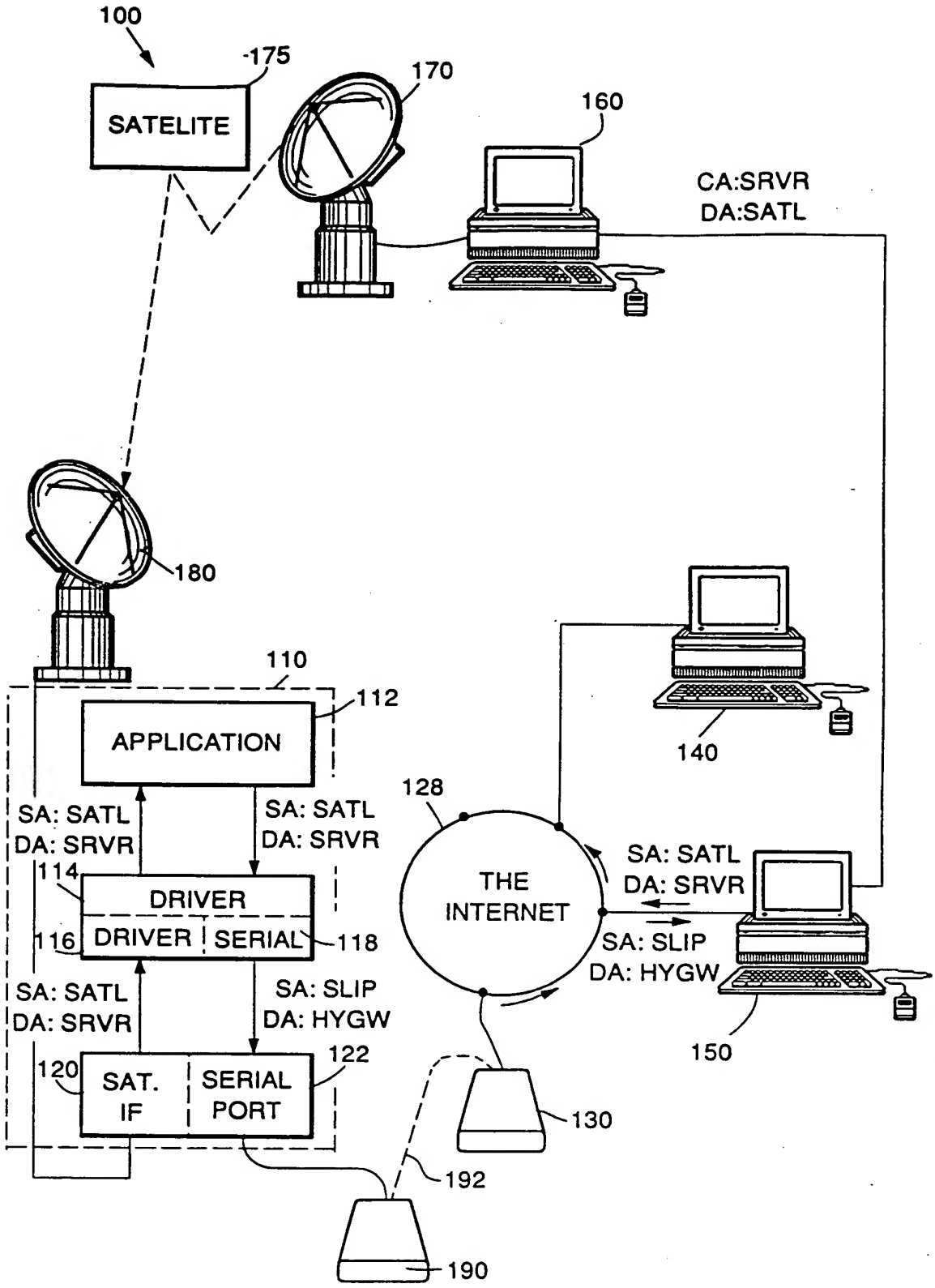

100
175
SATELITE
170
160
CA:SRVR
DA:SATL
180
110
112
APPLICATION
SA: SATL
DA: SRVR
SA: SATL
DA: SRVR
114
DRIVER
116
DRIVER
SERIAL
118
SA: SATL
DA: SRVR
SA: SLIP
DA: HYGW
120
SAT. IF
SERIAL PORT
122
140
128
THE INTERNET
SA: SATL
DA: SRVR
SA: SLIP
DA: HYGW
150
130
192
190

FIG. 1.

FIG. 2.

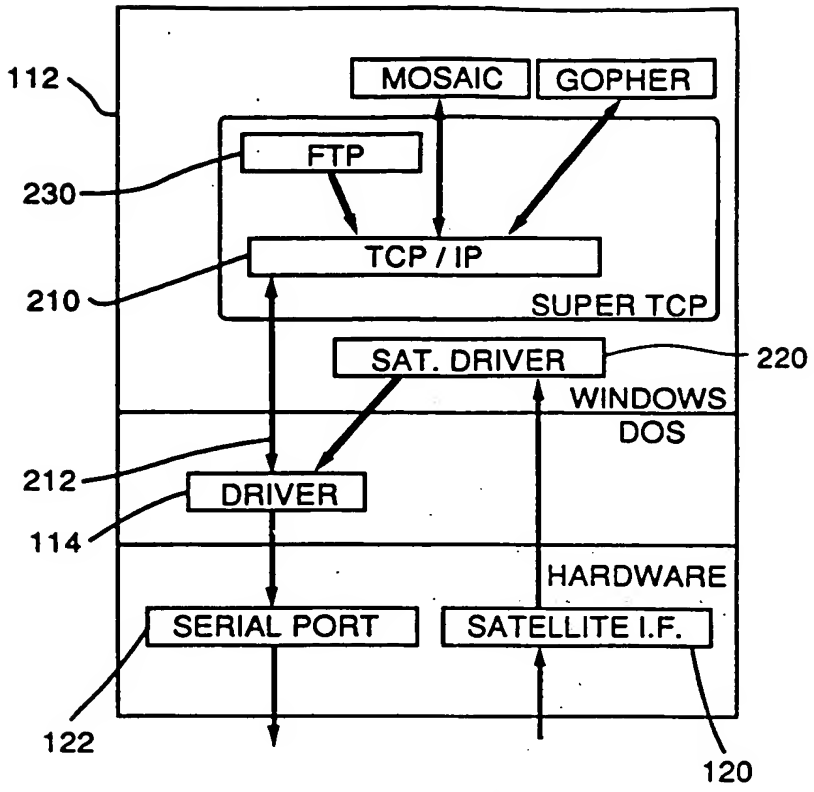


FIG. 3.

310

NORMAL IP PACKET

VERS	HLEN	SERVICE TYPE	TOTAL PACKET LENGTH
IDENTIFICATION NUMBER		FLAGS	FRAGMENT OFFSET
TIME TO LIVE	PROTOCOL	HEADER CHECKSUM	
SOURCE IP ADDRESS			
DESTINATION IP ADDRESS			
IP OPTIONS (IF ANY)			PADDING
DATA			

BIT 0 BIT 32

FIG. 4.

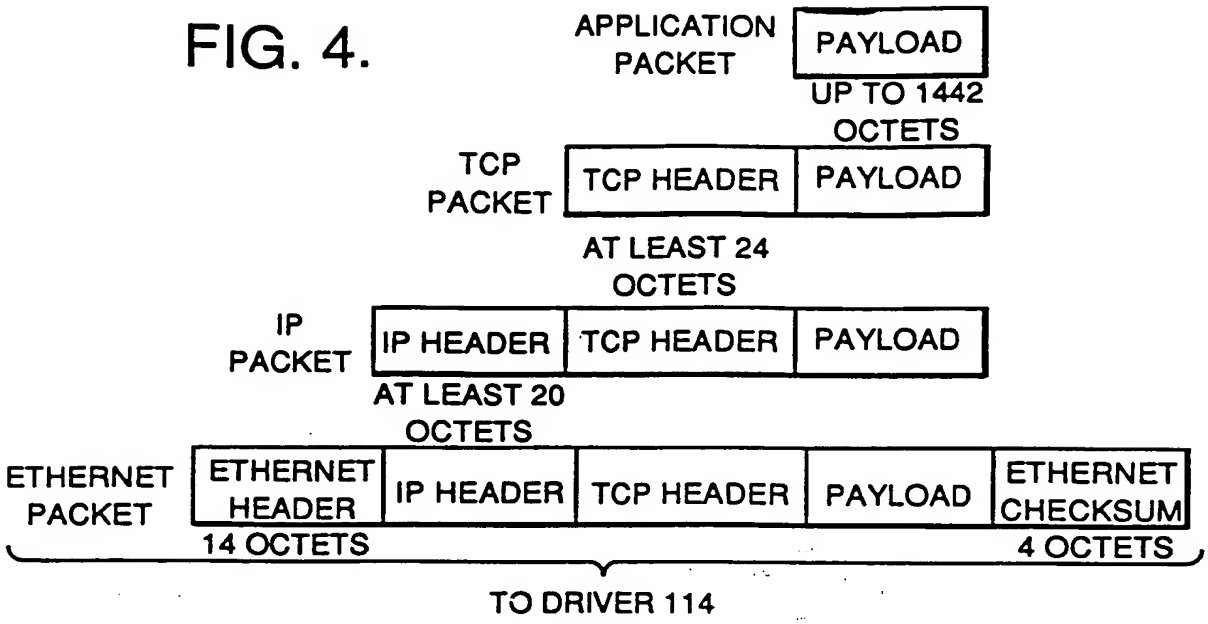
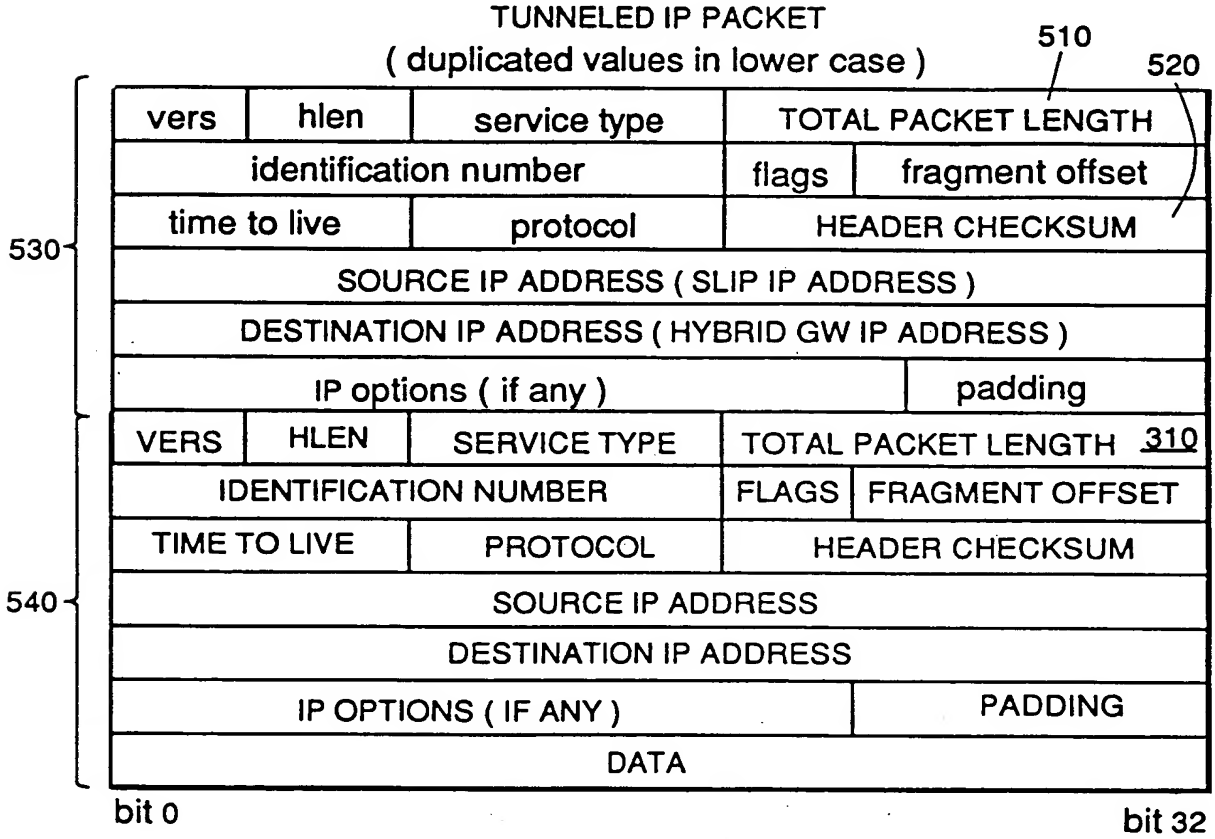

APPLICATION PACKET
PAYLOAD
UP TO 1442 OCTETS
TCP PACKET
TCP HEADER
PAYLOAD
AT LEAST 24 OCTETS
IP PACKET
IP HEADER
TCP HEADER
PAYLOAD
AT LEAST 20 OCTETS
ETHERNET PACKET
ETHERNET HEADER
IP HEADER
TCP HEADER
PAYLOAD
ETHERNET CHECKSUM
14 OCTETS
4 OCTETS
TO DRIVER 114

FIG. 5.


TUNNELED IP PACKET
(duplicated values in lower case)
510
520
vers
hlen
service type
TOTAL PACKET LENGTH
identification number
flags
fragment offset
time to live
protocol
HEADER CHECKSUM
530
SOURCE IP ADDRESS (SLIP IP ADDRESS)
DESTINATION IP ADDRESS (HYBRID GW IP ADDRESS)
IP options (if any)
padding
VERS
HLEN
SERVICE TYPE
TOTAL PACKET LENGTH
310
IDENTIFICATION NUMBER
FLAGS
FRAGMENT OFFSET
TIME TO LIVE
PROTOCOL
HEADER CHECKSUM
540
SOURCE IP ADDRESS
DESTINATION IP ADDRESS
IP OPTIONS (IF ANY)
PADDING
DATA
bit 0
bit 32

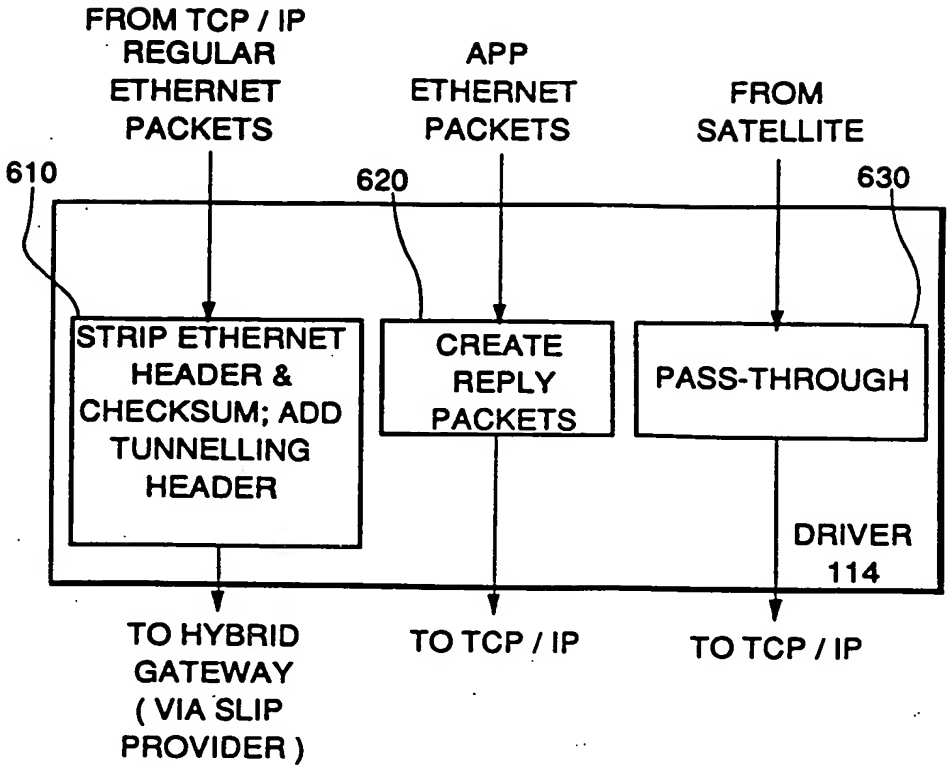

FROM TCP / IP REGULAR ETHERNET PACKETS
APP ETHERNET PACKETS
FROM SATELLITE
610
620
630
STRIP ETHERNET HEADER & CHECKSUM; ADD TUNNELLING HEADER
CREATE REPLY PACKETS
PASS-THROUGH
DRIVER 114
TO HYBRID GATEWAY (VIA SLIP PROVIDER)
TO TCP / IP
TO TCP / IP

FIG. 6.

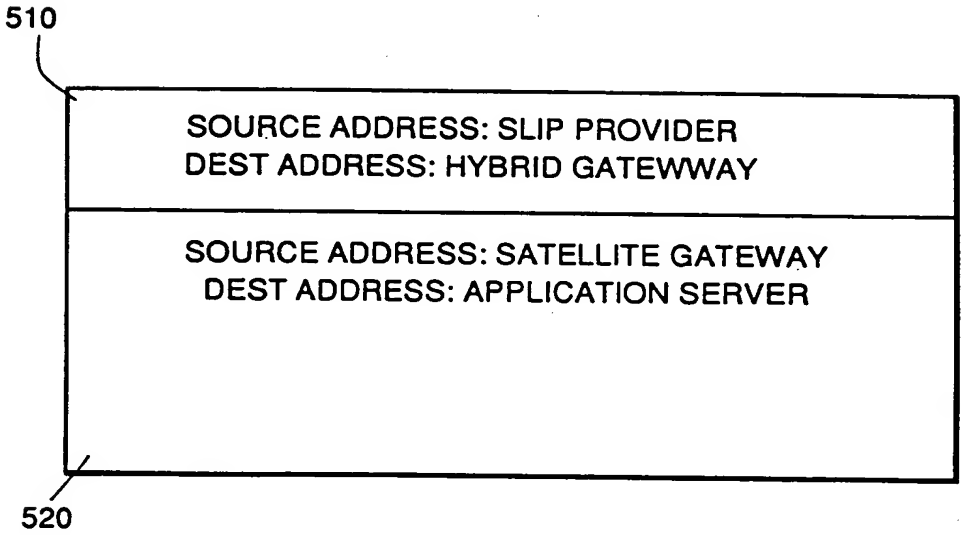

510
SOURCE ADDRESS: SLIP PROVIDER
DEST ADDRESS: HYBRID GATEWWAY
SOURCE ADDRESS: SATELLITE GATEWAY
DEST ADDRESS: APPLICATION SERVER
520

FIG. 7.

FIG. 8.

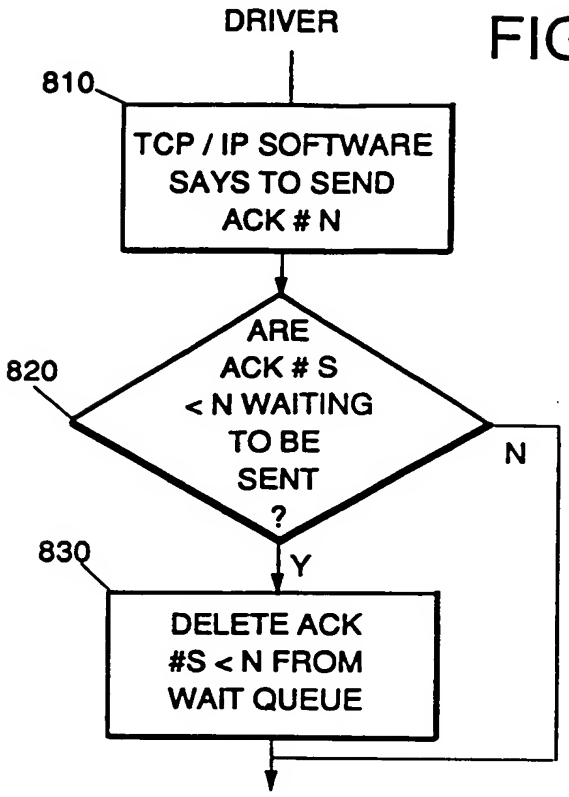

DRIVER
810
TCP / IP SOFTWARE SAYS TO SEND ACK # N
820
ARE ACK # S < N WAITING TO BE SENT ?
N
Y
830
DELETE ACK #S < N FROM WAIT QUEUE

FIG. 9.

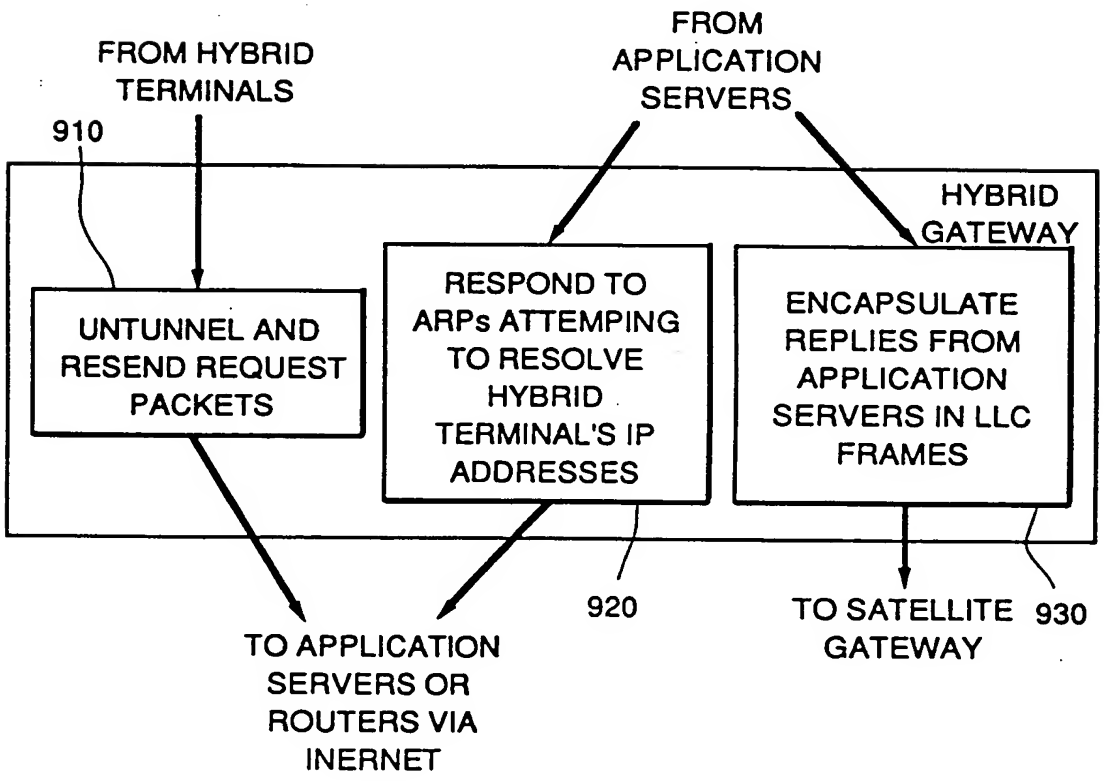

FROM HYBRID TERMINALS
FROM APPLICATION SERVERS
910
HYBRID GATEWAY
UNTUNNEL AND RESEND REQUEST PACKETS
RESPOND TO ARPs ATTEMPING TO RESOLVE HYBRID TERMINAL'S IP ADDRESSES
ENCAPSULATE REPLIES FROM APPLICATION SERVERS IN LLC FRAMES
920
930
TO APPLICATION SERVERS OR ROUTERS VIA INERNET
TO SATELLITE GATEWAY

FIG. 10.

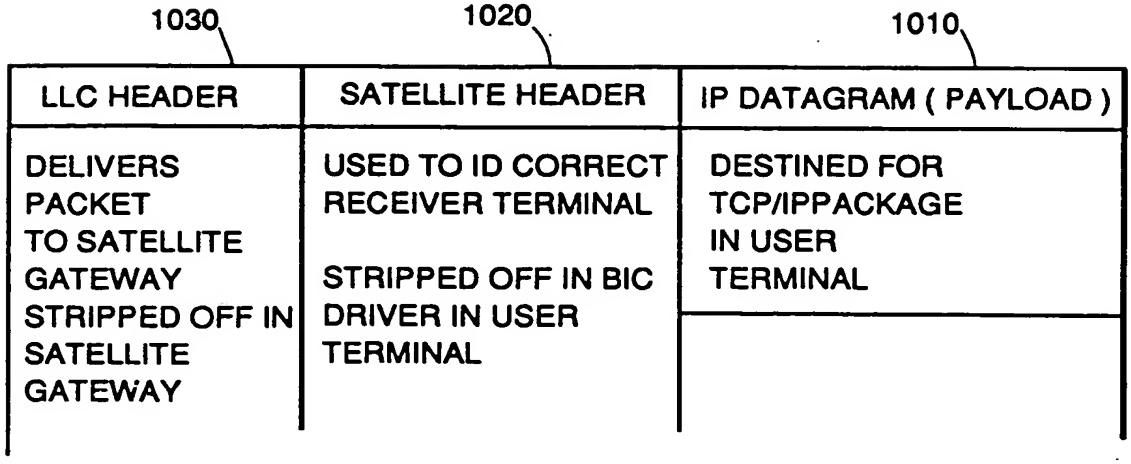

1030
1020
1010
LLC HEADER
SATELLITE HEADER
IP DATAGRAM (PAYLOAD)
DELIVERS PACKET TO SATELLITE GATEWAY STRIPPED OFF IN SATELLITE GATEWAY
USED TO ID CORRECT RECEIVER TERMINAL
STRIPPED OFF IN BIC DRIVER IN USER TERMINAL
DESTINED FOR TCP/IPPACKAGE IN USER TERMINAL

FIG. 11.

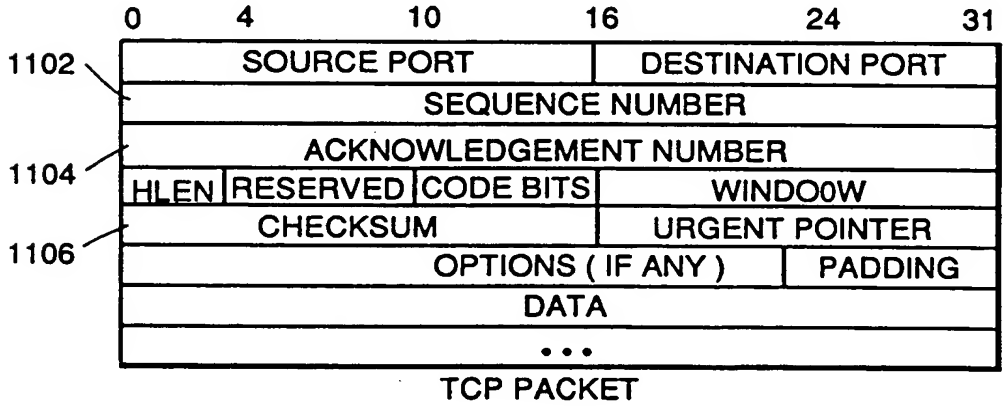

0
4
10
16
24
31
1102
SOURCE PORT
DESTINATION PORT
SEQUENCE NUMBER
ACKNOWLEDGEMENT NUMBER
1104
HLEN
RESERVED
CODE BITS
WINDO0W
CHECKSUM
URGENT POINTER
1106
OPTIONS (IF ANY)
PADDING
DATA
• • •
TCP PACKET

FIG. 12.

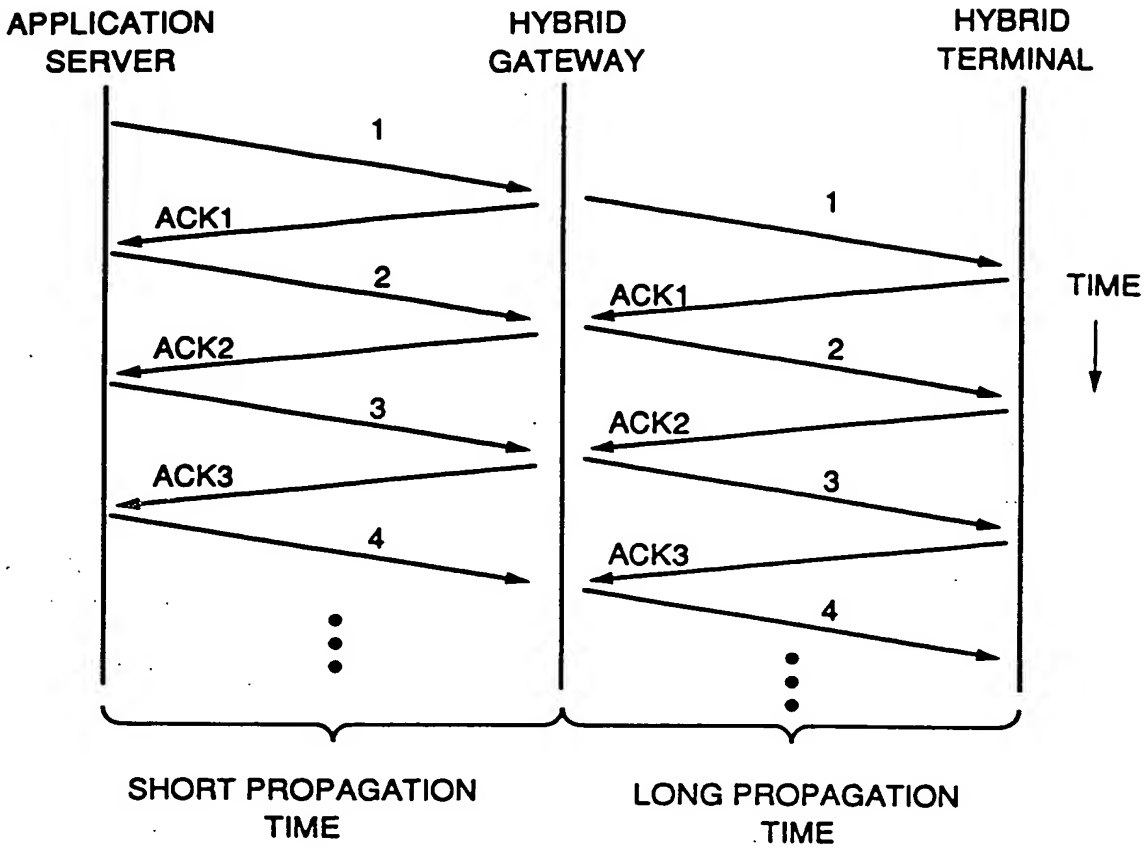


FIG. 13a.

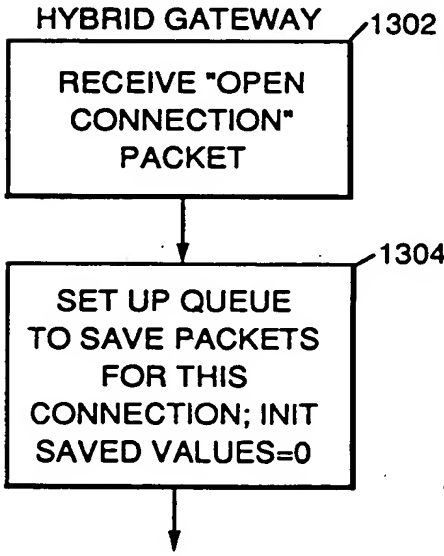


FIG. 13b.

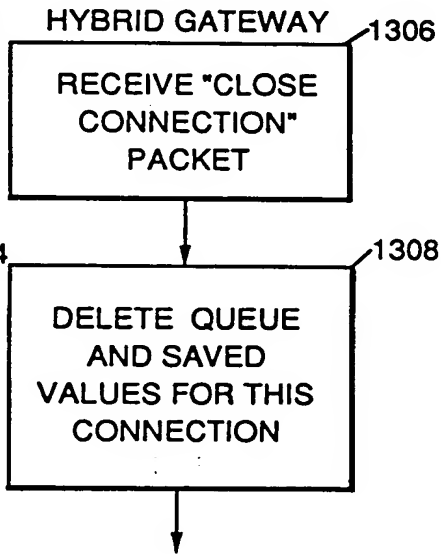


FIG. 13c.

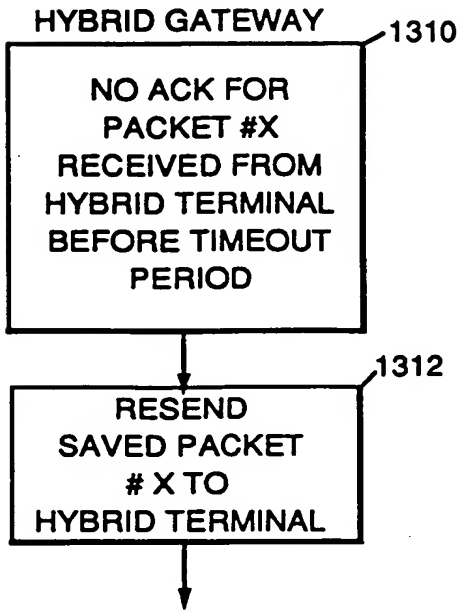


FIG. 13d.

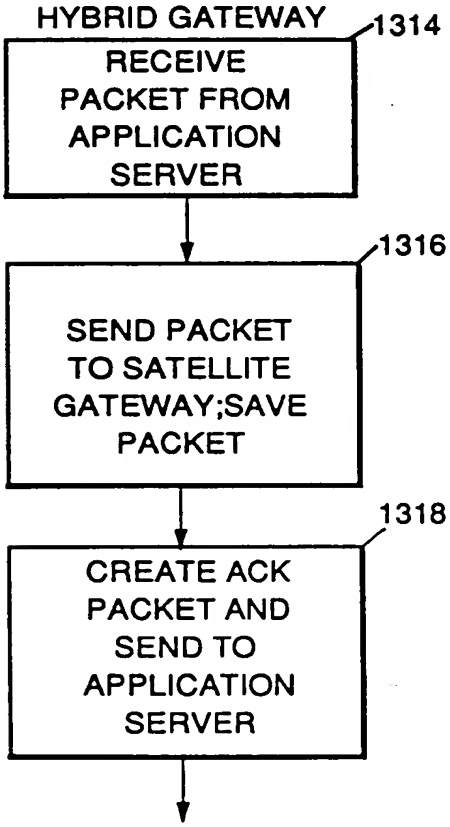
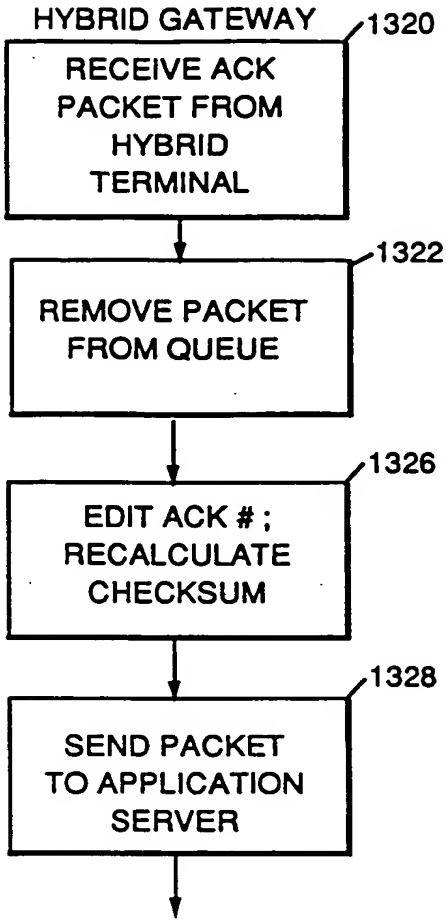


FIG. 13e.



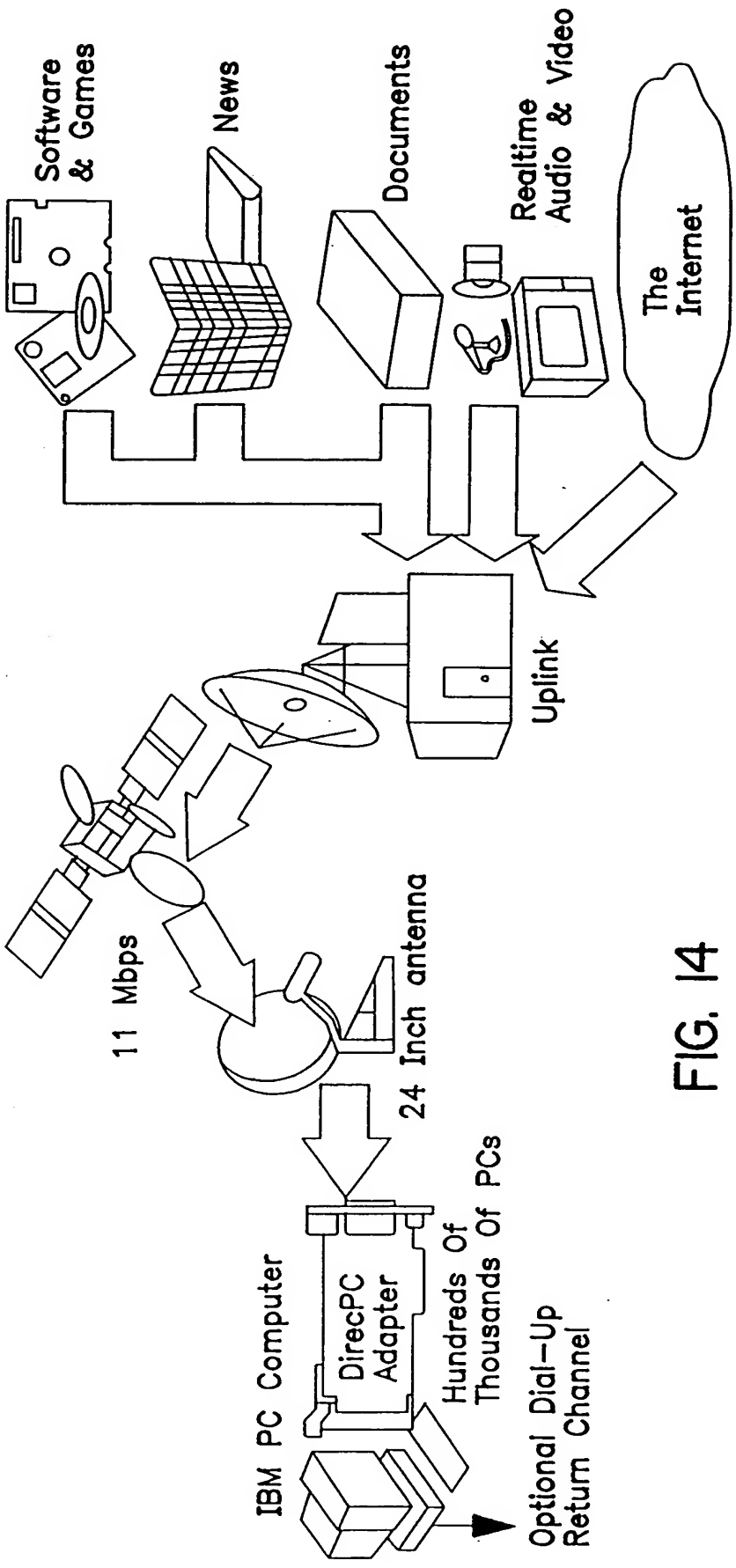

Software & Games
News
Documents
Realtime Audio & Video
The Internet
Uplink
11 Mbps
24 Inch antenna
IBM PC Computer
DirecPC Adapter
Hundreds Of Thousands Of PCs
Optional Dial-Up Return Channel

FIG. 14

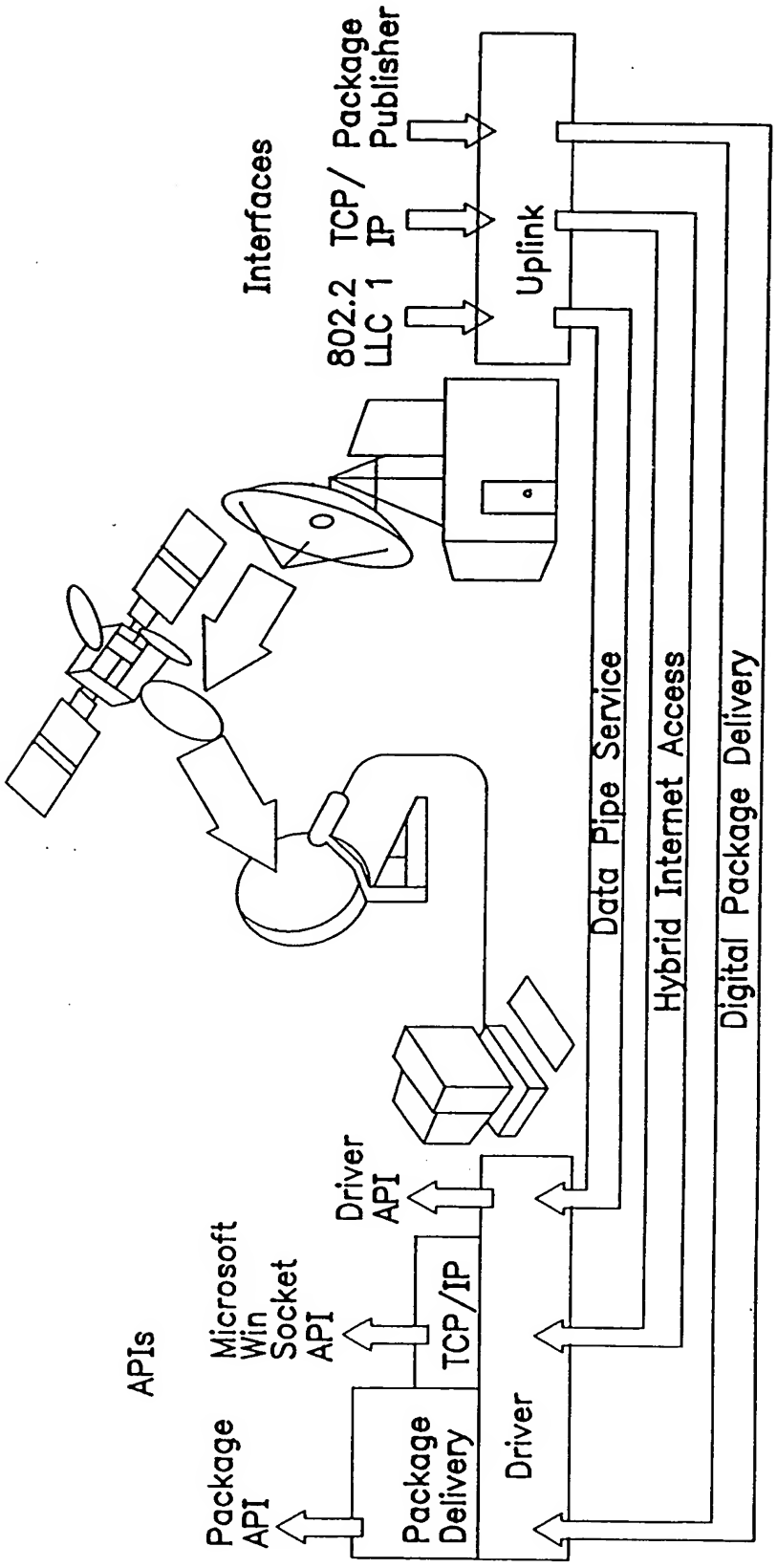

Interfaces
802.2 LLC 1
TCP/ IP
Package Publisher
Uplink
Data Pipe Service
Hybrid Internet Access
Digital Package Delivery
Driver API
Microsoft Win Socket API
TCP/IP
Package API
Package Delivery
Driver
APIs

FIG. 15